

TESTIMONY FOR THE RECORD
OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE
U.S. ENVIRONMENTAL PROTECTION AGENCY
FOR THE COMMITTEE ON SCIENCE AND TECHNOLOGY
UNITED STATES HOUSE OF REPRESENTATIVES

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Mr. Chairman and members of the Committee, thank you for the opportunity to provide testimony on electronics and the U.S. Environmental Protection Agency's (EPA's) efforts to encourage more environmentally preferable electronics product design and recycling.

EPA's Resource Conservation Challenge (RCC) seeks to renew the emphasis on resource conservation under the Resource Conservation and Recovery Act (RCRA) and the emphasis on preventing pollution and conserving natural resources under the Pollution Prevention Act. The RCC brings greater urgency to EPA's message of reducing, reusing, and recycling valuable materials habitually discarded by American industry and the general public by linking the importance of these activities to energy conservation and greenhouse gas (GHG) reductions. One key area of focus under the RCC is electronics.

WHY WE CARE ABOUT ELECTRONICS AT EPA

EPA has been actively helping to improve the design and recovery of electronics for more than ten years. Our interest in electronics stems from four primary concerns:

- 1) rapid growth and change in this product sector, leading to a constant stream of new product offerings and a wide array of obsolete products needing appropriate management;
- 2) energy consumption by these products (the Energy Information Agency's Annual Energy Outlook 2006 projects that electronics will account for 19 percent of residential energy use by 2020, compared with 14 percent of home energy consumption in 2006);

- 3) the presence of toxic substances in many products which can cause problematic exposures during manufacturing, recycling or disposal, if not properly managed – the presence of these constituents has sparked the search for workable substitutes and development of better management practices; and
- 4) the need to ensure widespread, convenient and affordable reuse/recycling infrastructure for electronics (with initial emphasis on TVs, PCs and cell phones) and, in doing so, to conserve and recover the large amount of embodied energy and valuable materials inherent in used electronics.

THE CHANGE IN TV TECHNOLOGY AND TRANSMISSION

Change is about to happen in the TV world. First, as prices come down for newer models, consumers are upgrading from the old cathode ray tube style of TV to newer, flat screen, high definition models (such as LCD and plasma). In addition, the “Digital Transition” is around the corner. On February 17, 2009, all full-power television stations will broadcast only in digital.¹ Nielsen estimates that more than 13 million households have TV sets that only receive over the air (OTA) analog broadcasts and an additional 6 million households have at least one OTA analog television set.² Households that receive free over the air television broadcasts on analog TVs must take action by connecting their TV to a digital-to-analog converter box, purchasing a digital television, or subscribing to a paid TV service.

Both of these changes are raising questions about how many old TVs will find their way to the recycling/disposal path in the near future. Some are predicting a “tidal wave” from the digital transition. More likely, however, the increase will be gradual over a several year time frame as consumers take advantage of falling prices for new TV technologies. The digital transition, by itself, is unlikely to cause a large spike in TV disposal. This is because fifty percent of homes already have digital TV so will receive programming after the changeover, without doing anything additional.³ In addition, those that have analog TV only, or other analog TVs in the home, can either obtain digital-to-analog converters or cable service to extend the life of their analog TVs. Furthermore, some homes will keep analog TVs to use for gaming or movies, or hand them off to someone else who may want to use them

¹ See 47 U.S.C. §§ 309(j)(14)(A), 337(e).

² The Nielsen Company. Press Release “13 Million U.S. Households Not Yet Ready for Digital Television Conversion, Nielsen Says.” February 15, 2008

³ Consumer Electronics Association. *Market Research Report: Trends in CE Reuse, Recycle and Removal*. April 2008.

this way. There are many options, and it is unlikely that a sudden wave of TV's will find their way to the recycling/disposal path due primarily to the digital transition in February 2009. Still the digital transition, plus the move to adopt new TV products, will mean that greater collection and recycling infrastructure will be needed to properly handle these TVs as they emerge from homes over the next few years.

WHAT ARE WE DOING ABOUT ELECTRONICS?

EPA is engaged in several broad scale partnerships with manufacturers, retailers, other Federal agencies, state and local governments, recyclers, non-government organizations (NGOs) and others to encourage and reward greener design of electronic products, to help develop the infrastructure for collection and reuse/recycling of discarded electronics, and to promote environmentally safe recycling of used electronics. More detail about each of these efforts is provided below.

1) GREENING DESIGN OF ELECTRONICS

EPEAT: EPA funded and participated in a multi-stakeholder and consensus-based process, involving electronics manufacturers, large government IT purchasers, NGOs and others, to develop the Electronics Product Environmental Assessment Tool (EPEAT). Now codified as IEEE Standard 1680, EPEAT was launched in 2006 to meet growing demand by large institutional purchasers for a means to readily distinguish environmentally-preferable desktop and laptop computers and monitors in the marketplace. Modeled on other environmental rating tools like the Leadership in Energy and Environmental Design's (LEED's) Green Building Rating system, EPEAT includes environmental criteria encompassing the product lifecycle. EPEAT also provides a system for registering and verifying equipment that meets its criteria. EPEAT-registered computers and monitors have reduced levels of toxics, are more energy efficient, easier to upgrade and recycle, and use more sustainable packaging than conventional equipment. EPA supported the development of EPEAT, and it is now a self-sustaining system operated by the Green Electronics Council.

EPEAT has been a tremendous success. Even with recent upgrades to the EPEAT criteria, there are more than 550 products from 26 manufacturers registered to the EPEAT standard. In the first six months the system was in place, manufacturers reported selling more than 36 million EPEAT-registered products. EPEAT is now the official environmental standard for electronics in all

federal purchasing. More than six states and many other public and private purchasers are specifying EPEAT equipment.

There is increasing demand for EPEAT to expand to additional products. This year, EPA is funding a neutral organization to convene stakeholders to develop standards for additional electronic products, including possibly TVs. EPA has committed resources to help develop four new standards. Interest is growing in using EPEAT to promote greener electronics purchases by consumers.

ENERGY STAR: Starting as early as summer 2008, consumers will be able to purchase ENERGY STAR qualified TVs covering all of today's screen technologies, in all sizes. The ENERGY STAR label will mean these products are up to 30 percent more energy efficient in both standby and active (when they are on) modes than conventional models. The approximately 275 million TVs currently in use in the U.S. consume over 50 billion kWh/year – or four percent of all households' electricity use. When coupled with digital video recorders, they account for about 13 percent of an individual household's electricity bill.

Energy consumption can vary greatly among different models. In general, the larger the TV, the more energy it will consume. However, when similarly sized products are compared, projection units use the least energy, followed by LCD products, with plasma products using the most energy. EPA will make available on the ENERGY STAR Web site an estimate of the annual kilowatt-hours (kWh) for all qualified TVs, so consumers are aware of the amount of energy the TV they are considering for purchase will use each year. On average, under the new requirements, an ENERGY STAR qualified TV will save \$35 off a consumer's utility bills over the life of the TV. If each TV purchased in the U.S. in one year were ENERGY STAR qualified, we would prevent more than three billion pounds of greenhouse gas emissions per year. This equals a savings of over two billion kWh and \$250 million in energy costs and reduces greenhouse gas emissions equal to taking about 300,000 vehicles off the road annually.⁴

⁴ Energy Star uses standard assumptions for converting energy savings to greenhouse gas (GHG) reductions and dollars saved. For GHG conversions used by the Energy Star program, please see <http://www.epa.gov/cleanenergy/energy-resources/refs.html>.

On April 24, 2008, EPA announced a new specification for “boxes” that deliver television and video content, also called set-top boxes. Effective January 1, 2009, new cable, satellite, and telecom set-top boxes that carry the ENERGY STAR will be at least 30 percent more energy efficient than conventional models. If, after this new specification goes into effect, all set-top boxes sold in the United States meet the Energy Star requirements, the savings in energy costs will grow to about \$2 billion each year and greenhouse gas emissions will be reduced by the equivalent of taking about 2.5 million vehicles off the road annually.

Furthermore, EPA recently made the ENERGY STAR available for digital-to-analog converter boxes (DTA’s). ENERGY STAR qualified DTAs are eligible for purchase under the National Telecommunications and Information Agency’s TV Converter Box Coupon Program. This program provides consumers coupons to save on the purchase of DTA’s so older TVs can continue to receive over-the-air broadcasting after February 17, 2009. Consumers are encouraged to check that a product is both a coupon-eligible converter box and ENERGY STAR qualified model prior to purchasing. Savings from an ENERGY STAR qualified DTA over a conventional model are estimated to be up to 37 kWh annually or \$4.

DESIGN FOR THE ENVIRONMENT (DfE): Over the years, EPA’s DfE Program has worked with the electronics industry to help green the manufacturing of electronics, as well as electronics products themselves. DfE has worked with the industry on ways to green the manufacture of printed wiring boards, assess the life-cycle impacts of CRTs and flat panel displays, and assess substitutes for tin-lead solder that have acceptable engineering performance yet are less toxic, and pose the fewest risks over their life cycle. The solder life-cycle assessment generated data to help manufacturers, users, and suppliers incorporate environmental considerations when choosing replacements for the 176 million pounds of leaded solder used annually in the United States.

DfE also recently completed a life-cycle assessment for various kinds of wire and cable products (including network and low voltage cables). The study results will help companies make environmentally- informed product and material choices and will identify the relative contributions of various processes and materials to the overall impacts of the wire and cable products.

ENCOURAGING MORE REUSE AND RECYCLING

PLUG-IN TO eCYCLING: Plug-In to eCycling is working, through partnerships, to expand infrastructure for collection and safe recycling of e-waste nationwide. In 2007, EPA's Plug-In partners collected more than 47 million pounds of electronics. The energy conserved through these recycling efforts is equivalent to the annual GHG emissions of taking nearly 24,000 cars off the road annually.⁵ Since the partnership began in 2003, Plug-In partners have recycled more than 142 million pounds of unwanted consumer electronics. All Plug-In partners, whether they recycle electronics directly or contract with others for recycling services, are required to abide by the Plug-In Guidelines for Materials Management. These Guidelines spell out preferred recycling practices for used electronic products.

Plug-In partners continue to demonstrate innovation and creativity in sponsoring collection events and take-back programs and reaching out to consumers. As an example, Dell has expanded its Reconnect partnership with Goodwill Industries to include select cities in six states. Reconnect, a comprehensive electronics recovery, reuse, and environmentally responsible recycling opportunity for consumers, is now providing electronics donation opportunities to several million households. Dell also has a free, online computer recycling program for consumers who own Dell computers.

In 2007, Staples, Office Depot, Hewlett Packard, and Sony also launched nationwide eCycling efforts. The Staples program, launched in May, lets consumers drop off their computers and other electronic office equipment at any of the company's 1,400 US retail locations. Sony's Take Back Recycling program, launched in September 2007, allows consumers to take, free of charge, their unwanted Sony-branded electronic products at 138 drop-off centers across the country run by Waste Management eCycle America.

As part of its Plug-In to eCycling program, EPA teamed up with cell phone manufacturers, service providers, and retailers in 2007 to increase America's cell phone recycling and donation rate. EPA distributed public service announcements and podcasts and increased publicity about available partner recycling programs.

⁵ EPA calculates these greenhouse gas (GHG) equivalent emissions reductions based on the WARM model (Waste Reduction Model), following a life-cycle assessment methodology using estimation techniques developed for national inventories of GHG emissions. See *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks* (EPA530-R-06-004). To convert GHG equivalent emissions to more easily understood metrics, such as cars off the road, gallons of gasoline, etc., EPA uses the Greenhouse Gas Equivalencies Calculator developed by the U.S. Climate Technology Cooperative.

These and other initiatives sponsored by industry, states, and recyclers are generating critical data which will inform policymaking on electronics recycling. These innovations are crucial to learning what works, what does not, where collaboration is possible and where it is not, what kinds of opportunities really get the attention of the consumer and what kind of material the consumer wants to recycle. And very importantly, these projects clarify what it costs to get electronics from the consumer into responsible recycling under varying circumstances.

FEDERAL ELECTRONICS CHALLENGE: The Federal government is a very large purchaser of IT products. To help the Federal government lead by example in buying green electronics and managing them appropriately at the end of their useful life, the Federal Environmental Executive and the EPA launched the Federal Electronics Challenge (FEC) in 2004. The FEC is a voluntary partnership program designed to help Federal agencies become leaders in promoting sustainable environmental stewardship of their electronic assets. As FEC Partners, Federal agencies work towards goals in all three of the electronics life-cycle phases – acquisition & procurement; operations & maintenance; and end-of-life management.

In 2007, the President signed Executive Order (E.O.) 13423, "Strengthening Federal Environmental, Energy, and Transportation Management." E.O. 13423 consolidates and strengthens five executive orders and two memorandums of understanding related to Federal government environmental, energy, and transportation performance and accountability, including electronics stewardship by Federal agencies. CEQ and OMB implementing instructions for the E.O. were issued later in 2007 requiring that all Federal agencies and their facilities participate in the FEC, or an equivalent program.

Today, the FEC has 16 Federal agency partners and 184 facility partners. Facility partners reported many successes in 2007. These included 1) 80 percent of computer desktops, laptops and monitors purchased or leased were EPEAT registered⁶, 2) 86 percent of monitors and 69 percent of computers had ENERGY STAR features enabled, and 3) 99 percent of non-reusable computers were recycled in an environmentally-sound manner.

⁶ The Federal Acquisition Regulations requirement that 95% of applicable Federal information technology purchases meet the EPEAT took effect in December of 2007. As a result, it is anticipated that more Federal purchases will be EPEAT-compliant in FY 2008.

The Recycling Electronics and Asset Disposition (READ) services program assists Federal agencies in assuring environmentally sound management of their electronic discards. Managed by EPA, the READ program offers Federal agencies access to recycling and asset disposition services providers that have been evaluated to ensure that they recycle and properly dispose of excess or obsolete electronics in an environmentally responsible manner.

3) WORKING TO IMPROVE ELECTRONICS RECYCLING

RESPONSIBLE ELECTRONICS RECYCLING PRACTICES: A broad group of stakeholders, including states, electronics manufacturers, electronics recyclers, trade associations and public interest groups, have been convened to develop voluntary “responsible recycling” (R2) practices for electronics recyclers, and a process for assessing conformity of recyclers with these practices. We expect that these practices will be implemented by private organizations, and not EPA. The dialogue began in 2006 and has resulted in a set of draft practices that has been reviewed by experienced facility auditors and will be undergoing field testing in the next few months. However, it should be noted that these draft practices have not been agreed to by the stakeholders and are likely to be further modified after field testing and further discussions.

The current draft includes provisions for recyclers to 1) comply with all applicable environmental, health, and safety legal requirements, 2) manage used and end-of-life electronic equipment based on a “reuse, recover, dispose” hierarchy of responsible management strategies, 3) utilize practices at their facilities that protect worker health and safety and the environment, 4) manage the R2 “focus materials” that pass through their facilities or under their control in a manner protective of worker health and safety, public health, and the environment, and 5) perform due diligence on downstream vendors to which it ships these materials, including those that are exported from the United States. “R2 focus materials” are materials in end-of-life electronics equipment that warrant greater care because of potential hazards during recycling, refurbishing, materials recovery, energy recovery, incineration, and/or disposal.

After the practices have been field tested, the stakeholder group expects to revisit and revise the practices based on information and recommendations gathered during the field testing process, and to make other changes as appropriate. EPA is also conducting research on electronics recycling that includes environmental sampling and characterization of an electronics recycling facility. Data from

this testing will assist the stakeholders in adopting practices to comply with applicable environmental requirements.

EXPORTS MANAGEMENT: It is well known that electronics material collected in the United States and other developed countries is exported to foreign countries. Some are concerned that this amounts to “exporting harm,” because electronics materials have been mishandled in some of the receiving locations. Those that object to exports of used electronics point to the coming digital transition and consumer upgrading to new TV technologies (e.g., LCD, plasma, flat screens) and the insufficient infrastructure in the US to process these materials as evidence that abuses abroad will only worsen. However, it must be recognized that while there have been demonstrated problems, export of electronics collected is a necessary and useful function, and important work is underway to ensure that these exports are managed appropriately at their destination. Also, it should be understood that without export of electronics as an option, most of the electronics in the United States would be disposed.

Used electronics can be exported to other countries for the purpose of continued use or recycling. It is difficult to generate good estimates of how much used and scrap electronics are exported for reuse and recycling, because data on export volumes is not always required to be reported. However, EPA has attempted to quantify the amount of CRT TVs and monitors that are exported for reuse or recycling. We estimate that more than 80 percent of CRT devices (including materials such as processed glass resulting from processing CRTs in the US) that are collected for reuse or recycling are sent to foreign markets.

Given the concerns expressed by some about improper handling of electronics abroad, should there be any export at all? There are examples of unsafe recycling practices in some areas of the world where dismantling occurs in unregulated and uncontrolled cottage industry conditions. However, there are also benefits associated with export of this material. Much of what goes abroad is whole equipment or components for reuse. This reuse avails many people in developing countries with information technology that would otherwise be unaffordable for them. Materials such as plastics or metals derived from electronics and processed in the United States make up another large portion of the amount exported. These “scrap” commodities are in high demand overseas as raw materials for manufacturing. Because most electronics are manufactured abroad, using materials from discarded electronics in the

manufacture of new electronics cannot occur unless the raw materials are sent back to where the products are manufactured.

Without international markets, many of the efforts currently underway in the United States to divert obsolete electronics away from disposal and toward reuse and recycling could not be sustained. For example: 1) there are no smelters/refiners in the United States to convert copper and precious metal (gold, silver, palladium) bearing electronics into metals that are pure enough for use; 2) there are no longer any cathode ray tube (CRT) glass furnaces in the Western Hemisphere for use of recycled CRT glass; 3) nearly all markets for plastics from electronics are overseas, primarily in Asia; and 4) the major markets for reuse (of both whole equipment and components) are outside the United States, mostly in developing countries.

At the same time, EPA is taking steps to improve the management of electronics sent abroad for management. This is particularly relevant to concerns that evolution to new TV technologies which will increase the number of old TVs available for end of life management. EPA's new CRT rule requires exporters of CRTs for reuse to file a one-time notification with EPA stating that they plan to export CRTs for reuse. The rule also requires persons who export CRTs for reuse to keep, for not less than three years, copies of business records demonstrating that each shipment of exported CRTs will be reused. This requirement provides United States regulatory authorities the opportunity to inspect these records in order to verify that the CRTs were actually sent to legitimate reuse or refurbishment entities. For export of CRTs and unprocessed CRT glass for recycling (as opposed to reuse), the rule requires both notification to EPA of the intended export and consent by the receiving country. These regulations are relatively new, and we are still in the process of implementing the requirements. These new requirements promise to ensure significantly better control over CRTs exported for recycling.

We also have several initiatives that promote safe management of used electronics exported for recycling, including the Plug-In guidelines for sound reuse and recycling of electronic products and the multi-stakeholder dialogue to issue "responsible recycling" practices for incorporation into a certification program for e-waste recyclers, both of which have previously been discussed in the testimony. EPA also led the development of international guidelines on the sound use and recycling of personal computers by the Organization for Economic Cooperation and Development (OECD). We participated in a Basel Convention partnership effort with industry that is developing guidelines for the

safe reuse, recycling and transboundary movement of used and scrap mobile phones. Finally, we are a participant in a working group of international stakeholders of academia, trade associations, industry and governments- called the StEP initiative- to identify voluntary activities that promote sound reuse and safe recycling, especially concerning the transboundary flows of electronics.

With global markets being essential to sustainable and sound management of electronics, the key is to continue to work towards assuring that management of electronics at their end-of-life is protective of human health and the environment whenever and wherever it takes place. EPA is committed to continuing its ongoing efforts in this regard.

Conclusion

EPA appreciates the Committee's interest in this issue and the opportunity to discuss the Agency's electronics goals, what efforts are currently underway, and how EPA works with partners throughout the product chain to achieve shared responsibility for a greener, recovery-oriented product cycle.